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## Book Reviews

DR SYLVIA D. FRIES

Reviews

### Space Station

Hans Mark: *Space Station: A Personal Journey*, Duke University Press, Durham, NC, 1987. Pp. 264. ISBN 0 8223 0727 8

While most of us will readily acknowledge the pre-war progenitors of space travel - men like Hermann Oberth and Robert H. Goddard - the peculiar mix of technology and geopolitics which produced modern space travel is a legacy of the last world war. Hans Mark, a stalwart supporter of a robust US manned space programme both as Undersecretary and Secretary of the US Air Force (1977-79; 1979-80), and as a Centre Director and Deputy Administrator for the National Aeronautics and Space Administration (1969-77; 1981-84), reveals in this memoir just how much the US manned space programme also owes to the outlook of the previous century.

Notwithstanding Mark's own straightforward explanation of the influence upon him of P. E. Cleator's *Rockets Through Space: The Dawn of Interplanetary Travel* (1936) and of Wernher von Braun, the source of Mark's own vision is revealed indirectly. Mark insists that people will go into space for non-quantifiable reasons (p. 45): 'I do not know how to quantify the value of putting people in space. What I do know is this: the argument is almost certainly beside the point. People will go into space for reasons that have nothing to do with . . . cost-benefit analysis.' And what are those reasons? They are implied in Mark's comparison of President Ronald Reagan's January 1984 espousal of NASA's space station initiative with President Thomas Jefferson's 1803 Louisiana Purchase, which inaugurated the American century of 'manifest destiny'; in his belief that Reagan's support of the space station amounted to affirmation of an inherently timeless expansionist vision; and in Mark's own echoes of the fear of Communist hegemony voiced by his University of California mentor, cold warrior physicist Edward Teller. Many transplanted Germans and Austrians of the 1940s - a migration that included Hans Mark's family - had an understandable fear of the Soviet Union; for some that fear became as much an element in visions of space exploration as advances in rocketry made before and during the war.

The central figure in Mark's 'personal journey' is its author and the events of his career. His bureaucratic and political role in the struggles for the survival, first of the US Shuttle programme and then of the space station initiative, form the principal story line. Mark's first-person account of the efforts to keep

the Shuttle programme aloft against substantial US military opposition is one of the most revealing episodes in the entire book. At the same time, one gets only a fleeting glimpse of the larger world around him. Mark's father, the distinguished international pioneer of polymer chemistry Herman F. Mark, figures small in comparison to P. E. Cleator or von Braun as sources of his inspiration. The reader wonders: is this the younger Mark's *apologia pro vita sua*? The considerable intellectual, social and political ferment that characterised the years he served as associate professor of nuclear engineering at the University of California at Berkeley (1961-1968) are dismissed as 'student rebellion' memorable for vulgar placards. Yet that ferment signalled the 'deep divisions' which would thwart efforts to follow the manned lunar landing of 1969 with a larger space programme.

While Mark's career, as retold here, is heavily populated, there are few personalities. Individuals, some quite important, are described either with stock virtues, or according to that ancient caveat: 'if you can't say anything nice, don't say anything at all.' Political and bureaucratic manoeuvring so fundamental to any complex and large government is treated discreetly. This may be because Mark's career, his personal journey, is as yet incomplete. In 1984 he left NASA to become Chancellor of the University of Texas System, a move dictated partly by financial necessity, partly by Dr Marion T. Mark's (his wife) desire for a change. He writes that he regrets having left NASA when he did. Perhaps he would welcome a chance to be a major player in the space programme again; his enthusiasm for that role surely accounts for the book.

Finally, readers will inevitably want to know Mark's reflections on the *Challenger* disaster. (See also Mark's article on this subject: *Interdisciplinary Science Reviews*, 12, 241, 1987.) He concedes that he knew about the fateful O-ring problem as early as 1977, but was more concerned with other problems, nozzle erosion on the solid rocket booster and the Shuttle main engines. He accepts the Rogers Commission Report as substantially correct. Had he been at Cape Kennedy the morning of 28 January 1986, heavy ice, he maintains, and not the warnings of engineers, would have given him pause.

'A failure in the human communication chain,' writes Mark, accounted for the disaster (p. 222). At the same time, Mark observes that engineers' warnings against premature launch were so common that (p. 221) 'the mere fact that a group of engineers opposed the launch because they were afraid one of their subsystems would not work was not enough to cancel the launch. In view of this, I do not know whether the recommendation of the Thiokol engineers not to fly would have been enough to persuade me not to launch *Challenger* on January 28 1986.' One wonders at the impotence of apprehensive engineers in an R and D organisation's 'human communication chain.'

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In the end we are left with an incomplete account of an incomplete journey. As with all memoirs, the events retold may be remembered differently by other participants. This reader hopes Dr Mark will continue to write in his diary (upon which this memoir is based), and that he will find time to share with us some reflections at the next crossroads.

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## HUGH HARVEY

### Reviews

## Knowing Everything about Nothing

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John Ziman, FRS: 'Knowing Everything about Nothing,' Cambridge University Press, UK, 1987. Pp xvii + 196. £15.00. ISBN 0 521 32385 1

Like every vocation, that of science is altering rapidly in response to wide social and economic changes. Much has been written about how these changes are disrupting the lives of blue-collar workers in the North of England and the Rust Belt in the United States, but science, because it is arcane to most sociologists, has been relatively ignored.

However, science as a career has been the interest of Professor Ziman, Chairman of the Science Policy Support Group in the United Kingdom, since 1960. In 1981 he and Professor R. J. H. Beverton, FRS, obtained a grant from the Science Research Council to make a comprehensive study of this matter. Their findings have now appeared in *Knowing Everything about Nothing*, a book that attempts to answer crucial questions that face a scientist who finds it necessary to change the direction of his career. So rapid is the development of science and technology that scientists, like other workers, are now often faced with the necessity of retraining as their special line of research becomes outmoded. Industry has long wrestled with this problem, and IBM, for example, has said that one of its most difficult decisions is what to do with its researchers when they reach the age of 30. Their expertise has been overtaken by the new crop of young graduates.

Much depends, of course, on how the scientist views his role and on whether he is versatile enough to go into administration or management, or into an entirely new field such as marketing or even politics. As the case of the former National Security Adviser to President Reagan, Vice Admiral John Poindexter, who holds a PhD in atomic physics, shows, a scientist is probably ill-equipped to enter the corridors of power. His rigidly compartmentalised mind can be responsible for incalculable politically damaging mistakes.

This book is written for working scientists and reads somewhat like a dissertation for an advanced degree.

For the nonscientist lacking knowledge of the structure of the research establishments, both public and private, in the UK, it may prove difficult to read, but it can introduce him to the sociology of science.

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Hugh Harvey, an English-born interdisciplinary physicist, spent 35 years with the Royal Dutch Shell Group on both sides of the Atlantic. He has now retired to a scholarly existence in North Carolina.

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## JOSEPH H. HULSE

### Reviews

## World Food Production

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M. S. Swaminathan and S. K. Sinha, Editors: *Global Aspects of Food Production*, Tycooly Publishing Ltd, UK, 1986. Pp. xvii + 449. ISBN 1 85148 009 9

This is a welcome addition to our literature on food, agriculture and development; the subject is one for which the editors are eminently qualified. To write the 18 papers that make up the volume, they have assembled an impressive list of authors, fourteen Indians, one Sri Lankan, three Americans, two Britons and one Hungarian. Without any derogation of the demonstrable competence of the contributors, and in light of the title 'Global Aspects...', one wonders whether some representation from Africa, the Middle East and Latin America might not have given a more truly global coverage.

In a thoughtful opening paper IFPRI scientists remind us again that as per capita income rises so does food consumption. Among the 12 rapid-growth non-oil-producing Third World countries during the 1970s, population increased 2.4%, per capita income 5.6% and food consumption over 5.0% per year. Increased demand causing increased food importation by the rapid-growth economies has serious consequences for the poorest developing countries, heavily saddled with debt and requiring sizeable food imports. Increases in food imports continue to exceed commodities exported by the majority of African nations. Of particular concern among food-deficient nations is the increased consumption of animal feeds, much being imported.

P. V. Sukhatme again advances the notion that overall malnutrition in developing countries may not be as formidable as often portrayed. Nonetheless, Sukhatme concedes that the extremely poor (maybe 15-20% of the total) often suffer energy deficiencies and functional malnourishment most evident among those in drought-prone areas and urban slums.

Malcolm Slessor draws upon a number of sources, half of them Indian, in a concise review of the energy balance in agriculture. Among other enlightening observations, he states that in the developing countries more than 50% of energy is from biological sources; in industrialised economies this figure is less than 2%. He projects energy requirements for wheat,